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Class 349 LIQUID CRYSTAL CELLS, ELEMENTS AND SYSTEMS[Click here to view a PDF version of this file](#)

- 1** **LIQUID CRYSTAL SYSTEM**
- 2** . Liquid crystal for recording or imaging on photosensitive medium
- 3** .. Printer or print bar
- 4** .. Exposure device for lithography
- 5** . Projector including liquid crystal cell (s)
- 6** .. Overhead projector
- 7** .. Video/motion picture projector
- 8** .. Plural light path projectors
- 9** ... Having light separated into S and P polarization
- 10** ... Wherein liquid crystal cells include microencapsulated or polymer dispersed liquid crystal
- 11** . Heads-up display
- 12** . Liquid crystal writing tablet
- 13** . Liquid crystal eyewear (glasses, goggles, etc.) — 351/158
- 14** .. For protection
- 15** . Stereoscopic
- 16** . Liquid crystal window
- 17** . Computational system employing liquid crystal element (neural network, correlation device, optical computer)
- 18** . Variable or rotatable retarder used with other retarders to produce filtering effects (Solc, Lyot, Partial)
- 19** **PARTICULAR EXCITATION OF LIQUID CRYSTAL**
- 20** . Thermal excitation
- 21** .. By heating electrode
- 22** .. By light beam heating (e.g., IR, laser, etc.)
- 23** . Magnetic or pressure excitation
- 24** . Optical excitation
- 25** .. With photoconductive layer (e.g., spatial light modulator(SLMs))
- 26** ... Of an alloy of S, Se, or Te
- 27** ... With silicon photoconductive layer
- 28** With silicon photodiode, N-I-N photoconductor structure, or P-I-P photoconductor structure
- 29** ... With particular light blocking layer for separating read and write lights
- 30** ... With particular dielectric mirror for spatial light modulator (i.e., SLM)
- 31** . Electron beam excitation
- 32** . Plasma excitation
- 33** . Electrical excitation of liquid crystal (i.e., particular voltage pulses, AC vs. DC, threshold voltages, etc.)
- 34** .. With application of holding or bias voltage (i.e., voltage which does not change the optical state of the liquid crystal)
- 35** .. For driving Grandjean to focal conic or dynamic scattering type liquid crystal
- 36** .. Including diverse driving frequencies
- 37** .. Polarity based driving
- 38** .. With supplemental capacitor
- 39** ... In active matrix with separate dedicated capacitor line
- 40** .. With antistatic elements
- 41** .. With particular switching device
- 42** ... Transistor

- 43 Structure of transistor
- 44 With light block conductively connected to transistor
- 45 Transferred transistor
- 46 With particular gate electrode structure
- 47 With gate electrode between liquid crystal and semiconductor layer
- 48 Plural nonredundant transistors per pixel
- 49 ... Two terminal nonlinear switching device (e.g., N-I-N, S-I-S, Ferroelectric, etc.)
- 50 Diode
- 51 Metal-insulator-metal (i.e., MIM)
- 52 With particular insulating layer
- 53 Varistor
- 54 .. Matrix including additional element (s) which correct or compensate for electrical fault
- 55 ... Laser links
- 56 PARTICULAR STRUCTURE**
- 57 . Lens or prism separate from projection system (i.e., it is not integral part of illumination system)
- 58 . Holder, support, frame, or housing
- 59 .. Including electromagnetic shielding
- 60 .. Including resilient support member
- 61 . Particular illumination
- 62 .. With integral optical element for guiding or distributing light from the light source
- 63 ... Specifically for guiding light in a front-lit device
- 64 ... Diffuser between light source and liquid crystal
- 65 ... Edge lit type light guide behind liquid crystal
- 66 ... Louvres
- 67 ... Reflector having particular shape behind light source
- 68 .. With plural diverse light sources (e.g., for day and night)
- 69 .. Electroluminescent light source
- 70 .. Fluorescent light source
- 71 ... Formed of planar phosphor or fluorescent layer separate from illumination source
- 72 . Detector of liquid crystal temperature
- 73 . Interconnection of plural cells in parallel (e.g., edge to edge)
- 74 . Interconnection of plural cells in series
- 75 .. For compensation of birefringence effects
- 76 ... Of twisted (or chiral) nematic or supertwisted nematic liquid crystal
- 77 .. With particular cooperation between cells (e.g., alternating selection or simultaneous selection of cells)
- 78 ... Cell cooperation providing multicolor display
- 79 With color formed by different dye in each cell
- 80 With color formed by different color polarizer or color filter associated with each cell
- 81 ... With cells being substantially identical and driven simultaneously, providing improved contrast
- 82 ... With projection of electrodes in one cell substantially nonoverlapping that of another cell (i.e., for improving resolution)
- 83 ... With each cell displaying a different pattern
- 84 . Having significant detail of cell structure only
- 85 .. Producing a greyscale effect
- 86 .. Microencapsulated or polymer dispersed liquid crystal
- 87 ... For variable polarizer
- 88 ... Polymer network liquid crystal
- 89 ... With particular encapsulating medium
- 90 With second material between liquid crystal and encapsulating medium
- 91 With nonpolymer encapsulating medium
- 92 ... Formed by particular technique
- 93 Having UV polymerized element
- 94 Formed with particular alignment technique

<u>95</u>	.. Microlenses
<u>96</u>	.. Polarizer
<u>97</u>	... Color
<u>98</u>	... Circular
<u>99</u>	... With particular non-zero angle between polarization axis and orientation direction
<u>100</u>	.... For ferroelectric liquid crystal
<u>101</u>	.... For supertwisted nematic liquid crystal
<u>102</u>	... With particular non-zero angle between polarization axis and compensator optical axis
<u>103</u>	... With particular non-zero and non-90 angle between opposite polarization axes
<u>104</u>	.. Filter
<u>105</u>	... Interference filter
<u>106</u>	... Color filter
<u>107</u>	.... With different liquid crystal thickness for each color of filter
<u>108</u>	.... With plural colors for each display element (i.e., each pixel or segment)
<u>109</u>	.... With unequal areas for different colors or with fractional shift between one line of colors and the next
<u>110</u>	... Opaque mask or black mask
<u>111</u>	.... Conductive mask
<u>112</u>	.. Diffuser (on viewer side of liquid crystal)
<u>113</u>	.. Reflector
<u>114</u>	... Dielectric mirror (i.e., in devices excited other than by photoconductive layer) or translector
<u>115</u>	... Cholesteric reflector
<u>116</u>	.. Photoconductive element (i.e., not used for exciting)
<u>117</u>	.. Compensator or retarder (i.e., not using liquid crystal cell)
<u>118</u>	... With refractive indices in the x, y, and z directions
<u>119</u>	... Multiple compensators
<u>120</u>	.... Including at least one with negative intrinsic birefringence
<u>121</u>	... With particular non-zero angle between compensator optical axis and orientation direction
<u>122</u>	.. Particular nonoptical film or layer (e.g., adhesive layer, barrier layer)
<u>123</u>	... Alignment layer
<u>124</u>	.... Formed by particular technique (e.g., Langmuir Blodgett, stretching, etc.)
<u>125</u>	..... Having particular deposited structure (e.g., angled, plural layered) produced by vapor deposition
<u>126</u>	..... Having structure produced by rubbing under particular rubbing conditions (e.g., particular direction, rubbing force, by using named rubbing material or roller, etc.)
<u>127</u>	.... Formed of a liquid crystal material
<u>128</u>	.... With different alignments on opposite substrates
<u>129</u>	.... With plural alignments on the same substrate
<u>130</u>	.... For perpendicular alignment
<u>131</u>	..... Silanes
<u>132</u>	.... For parallel alignment
<u>133</u>	..... With chiral smectic liquid crystal (includes ferroelectric liquid crystal)
<u>134</u>	..... With particular pretilt angle from the alignment layer
<u>135</u>	..... With particular polymer composition of the alignment layer (e.g., fluorine-containing aliphatic polyamide)
<u>136</u>	..... With particular pretilt angle (i.e., with liquid crystal other than chiral smectic)
<u>137</u>	... Antireflection layer
<u>138</u>	... Insulating layer
<u>139</u>	.. Electrode or bus detail (i.e., excluding supplemental capacitor and transistor electrodes)
<u>140</u>	... Formed of semiconductor material
<u>141</u>	... Interdigitated (comb-shaped) electrodes
<u>142</u>	... Segmented or fixed pattern
<u>143</u>	... Matrix electrodes
<u>144</u>	.... Split pixels

<u>145</u>	.... Nonrectilinear rows and columns
<u>146</u>	.... Nonrectangular (odd) shaped pixels
<u>147</u>	.... Multilayer electrodes
<u>148</u>	.... Resistance reducing electrodes
<u>149</u>	... Having connection detail to external circuit
<u>150</u>	.... Featuring flexible circuit (i.e., tape automated bonding (TAB), etc.)
<u>151</u>	.... With driving circuit having input and output electrodes on liquid crystal substrate
<u>152</u>	.... With detail of terminals to external circuit
<u>153</u>	.. Liquid crystal seal
<u>154</u>	... With particular injection port or injection plug
<u>155</u>	.. Spacer
<u>156</u>	... Formed as walls (e.g., between pixels) or integral with substrate
<u>157</u>	... Plural types in single liquid crystal cell
<u>158</u>	.. Substrate
<u>159</u>	... Fiberoptic faceplate
<u>160</u>	... With particular topology (i.e., other than for diffraction and spacers)
<u>161</u>	.. Heating or cooling element other than for exciting
<u>162</u>	.. Dual function layer or element
<u>163</u>	.. Nonchiral additive in the liquid crystal material
<u>164</u>	... Fluorescent additive
<u>165</u>	... Pleochroic dye
<u>166</u>	... Nonspacer particles significantly smaller than liquid crystal thickness (e.g., scattering centers, ferromagnetic particles, etc.)
<u>167</u>	WITH SPECIFIED NONCHEMICAL CHARACTERISTIC OF LIQUID CRYSTAL MATERIAL
<u>168</u>	. Utilizing change between diverse phases (e.g., cholesteric to nematic)
<u>169</u>	. Utilizing change within liquid crystal phase (e.g., Grandjean to focal conic, etc.)
<u>170</u>	. Utilizing reversal in sign of dielectric anisotropy
<u>171</u>	. Within smectic phase
<u>172</u>	.. Within chiral smectic phase (includes ferroelectric)
<u>173</u>	... Greyscale resulting from liquid crystal property other than solely Smectic A
<u>174</u>	... Antiferroelectric
<u>175</u>	. Within cholesteric phase
<u>176</u>	.. Using reflection characteristic
<u>177</u>	. Within nematic phase
<u>178</u>	.. Negative dielectric anisotropy only
<u>179</u>	.. Twisted (or chiral) nematic or supertwisted nematic
<u>180</u>	... Having particular parameter of twist
<u>181</u>	... Having particular birefringence or retardation
<u>182</u>	CELL CONTAINING LIQUID CRYSTAL OF SPECIFIC COMPOSITION
<u>183</u>	. Polymer liquid crystal
<u>184</u>	. In smectic phase
<u>185</u>	. In cholesteric phase
<u>186</u>	. In nematic phase
<u>187</u>	NOMINAL MANUFACTURING METHODS OR POST MANUFACTURING PROCESSING OF LIQUID CRYSTAL CELL
<u>188</u>	. Changing liquid crystal phase
<u>189</u>	. Injecting liquid crystal
<u>190</u>	. Sealing of liquid crystal
<u>191</u>	. Aligning liquid crystal with means other than alignment layer
<u>192</u>	. Defect correction or compensation
<u>193</u>	LIQUID CRYSTAL OPTICAL ELEMENT
<u>194</u>	. Passive liquid crystal polarizer
<u>195</u>	. Antidazzle mirror formed from liquid crystal cell
<u>196</u>	. Beam dividing switch formed from liquid crystal cell
<u>197</u>	.. Including passive liquid crystal switch portion
<u>198</u>	. Liquid crystal etalon
<u>199</u>	. Liquid crystal sensors (e.g., voltmeters, pressure sensors, temperature sensors)

- 200 . Liquid crystal lenses other than for eyewear
- 201 . Liquid crystal diffraction element
- 202 .. For beam steering

FOREIGN ART COLLECTIONS

FOR000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collection listed below. These collections contain ONLY foreign patents or nonpatent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

UTILIZING A LIQUID CRYSTAL MATERIAL (359/36)

- FOR100 . With particular illumination (359/48)
- FOR101 .. Having optical element (e.g., curved reflector behind light source, etc.) (359/49)
- FOR102 .. Fluorescent light (e.g., FLAD type) (359/50)
- FOR103 . Microencapsulated liquid crystal (359/51)
- FOR104 .. With particular encapsulating medium (359/52)
- FOR105 . Plural contiguous cells (359/53)
- FOR106 . Having electrodes arranged into rows and columns (359/54)
- FOR107 .. With liquid crystal electrode excitation (359/55)
- FOR108 ... For ferroelectric liquid crystal (359/56)
- FOR109 ... With particular switching device (359/57)
- FOR110 .. With particular switching device (359/58)
- FOR111 ... Transistor (359/59)
- FOR112 ... Diode (359/60)
- FOR113 . Having particular nonelectrical detail of cell structure enclosing or adjacent liquid crystal material (359/62)
- FOR114 .. Polarizer (359/63)
- FOR115 ... Color (359/64)
- FOR116 ... Circular (359/65)
- FOR117 .. Diffuser (359/69)
- FOR118 ... Dielectric mirror or transflector (359/71)
- FOR119 .. Particular nonoptical film or layer (e.g., adhesive layer, barrier layer, etc.) (359/74)
- FOR120 ... Alignment layer (359/75)

- FOR121 Formed by particular technique (e.g., vapor deposition, rubbing, etc.) (359/76)
 - FOR122 For perpendicular alignment (359/77)
 - FOR123 For parallel alignment (359/78)
 - FOR124 .. Substrate (359/82)
 - FOR125 .. Holder, support, or frame (359/83)
 - FOR126 . With specified electrode excitation characteristic of liquid crystal material (359/84)
 - FOR127 .. Provided by particular circuit (359/85)
 - FOR128 . With detector of liquid crystal temperature (359/86)
 - FOR129 . Electrode detail (359/87)
 - FOR130 .. Reversal in sign of dielectric anisotropy (359/92)
 - FOR131 . Birefringers effect (359/93)
 - FOR132 . Variable index of refraction (359/94)
 - FOR133 . Variable diffraction (359/95)
 - FOR134 . Variable absorption of light due to an additive in the liquid crystal material (359/96)
 - FOR135 .. Flurescent additive (359/97)
 - FOR136 .. Pleochroic dye (359/98)
 - FOR137 . With specified nonchemical characteristic of liquid crystal material (359/99)
 - FOR138 .. Within smectic phase (359/100)
 - FOR139 .. Within cholestric phase (359/101)
 - FOR140 .. Within nematic phase (359/102)
 - FOR141 . Cell containing liquid crystal of specified composition (359/103)
 - FOR142 .. In smectic phase (359/104)
 - FOR143 .. In cholesteric phase (359/105)
 - FOR144 .. In nematic phase (359/106)
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